

Applicant : Jianshe Tang, et al.
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Attorney's Docket No.: 05542-390001 / 3899/CMP

REMARKS

Claims 1-5, 9-15 and 17 are pending in this application. Claim 19 is cancelled and claim 15 was withdrawn from consideration in response to a restriction requirement of June 18, 2002.

Claims 1-5, 9, 10 and 12 are rejected under 35 USC §103(a) as being unpatentable over U.S. Patent No. 6,227,955 ("Custer") in view of U.S. Patent No. 5,830,806 ("Hudson").

Claims 11, 13, 14 and 17 are objected to as being dependent upon a rejected base claim.

The applicant respectfully traverses the rejections and requests reconsideration in view of the following remarks.

Claims 1-5, 9, 10 and 12

The Examiner rejected claims 1-5, 9, 10 and 12 under 35 USC § 103(a) as being unpatentable over Custer in view of Hudson. Claim 1 recites a carrier head including a retaining ring, a pressurizable chamber and a fluid-tight flexible membrane. The membrane includes an inner surface that forms a boundary of the pressurizable chamber and a rough outer surface to press a substrate against a polishing surface, where the outer surface is rougher than the inner surface.

The Examiner asserts that Custer discloses a carrier head including a retaining ring, a pressurizable chamber and a fluid-tight flexible membrane with an inner surface that forms a boundary of the pressurizable chamber and a "rough" outer surface to press a substrate against a polishing surface. The Examiner recognizes that Custer does not disclose that the outer surface is rougher than the inner surface in order to make the membrane sufficiently rough so that the substrate does not move relative to the membrane. However, the Examiner further asserts that Hudson discloses it is well known in the art to make a flexible membrane from a "high friction material" such that a substrate does not move relative to the membrane. The Examiner concludes it would have been obvious to one having ordinary skill in the art to have modified Custer by manufacturing the membrane from a "high friction material", which is sufficiently rough such that the substrate does not move relative to the membrane as taught by Hudson, in order to insure accurate planarizing of the substrate.

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According to MPEP §706.02(j), "[t]o establish a prima facie case of obviousness ... there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings". The applicant respectfully submits that no suggestion or motivation can be found in either Custer or Hudson to combine the two references.

Hudson discloses that a compressible wafer backing member, such as a resilient pad, can be used during planarization of a wafer, but asserts that such backing members generally inhibit independent movement of the wafer in the wafer carrier because they are generally made from high friction materials and inhibit relative movement between the wafer and the wafer carrier, and are therefore not well suited for use with CMP processes that allow the wafer to move independently from the wafer carrier. Hudson goes on to teach using a wafer backing member including a first layer that is "preferably a low-friction material that allows the wafer to readily slide under the first layer."

First, the applicant respectfully submits that although Hudson may disclose a compressible wafer backing member of a high friction material, the backing member is not a flexible member forming a boundary of a pressurizable chamber (as required by claim 1), and by contrast is described as a resilient pad. Further, the pad may be porous, and as such could not form a boundary of a pressurizable chamber as required by claim 1.

Second, there is no motivation expressed or suggested by the references to combine the backing member referred to (but not advocated) by Hudson with the carrier head of Custer. Custer does not identify any problems associated with a wafer moving relative to the bladder of the carrier head, nor does Custer express whether or not it is preferable for the wafer to move (as advocated by Hudson) or not move during planarization. Accordingly, there is no reason to modify Custer by manufacturing the bladder from a high friction material, as asserted by the Examiner. Hudson seems to teach away from this, preferring a low friction material for CMP, and Custer does not suggest any motivation for modifying the bladder.

Third, even by combining a high friction material of Hudson and a bladder of Custer, not all of the limitations of claim 1 are satisfied. Neither Hudson nor Custer disclose a flexible

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membrane wherein the outer surface is rougher than the inner surface, as required by claim 1. The Examiner asserts that "whether or not the outer surface of the membrane is rougher than the inner surface would have been an obvious matter of choice and structural design to one having ordinary skill in the art." The applicant respectfully submits this is an improper rejection. The onus is on the Examiner to provide a motivation first, to combine Custer and Hudson and second, to modify the combination of Custer and Hudson, such that the modified, combination includes a "flexible membrane wherein the outer surface is rougher than the inner surface." The Examiner has failed to provide any motivation to modify the references to meet this limitation of claim 1.

Accordingly, for at least the above reasons, claim 1 is allowable over Custer in view of Hudson, and claims 2-5 which depend from claim 1 are allowable for at least the same reasons.

Claim 9 recites a carrier head that includes a flexible membrane having an outer surface that is rougher than the inner surface. Accordingly, for at least the same reasons stated above in reference to claim 1, claim 9 is allowable over Custer in view of Hudson. Claims 10 and 12 depend from claim 9 and are also in condition for allowance.

Claims 11, 13, 14 and 17

Claims 11, 13, 14 and 17 are objected to as being dependent upon a rejected base claim. As requested by the Examiner, the applicant has rewritten claims 11, 13, 14 and 17 in independent form including all of the limitations of the base claim and any intervening claims. Accordingly, these claims are in condition for allowance.

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Please apply the \$86 charge for one additional independent claim to deposit account 06-1050. Any additional charges or credits should also be applied to deposit account 06-1050.

Respectfully submitted,

Date: 2/19/04


Brenda Leeds Binder
Limited Recognition under 37 CFR § 10.9(b)

Fish & Richardson P.C.
500 Arguello Street, Suite 500
Redwood City, California 94063
Telephone: (650) 839-5070
Facsimile: (650) 839-5071

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